

WHAT IS CLAIMED IS:

1. A computer-implemented method for activating a service in a network, the method comprising:

- 5 (a) receiving a service order having one or more service components with each component being in a generic service request format;
- (b) routing each of the one or more service components to an appropriate domain manager;
- (c) translating the service component in each appropriate domain manager into corresponding device specific parameters; and
- (d) activating network elements responsive to the device specific parameters in order to activate the network service.

2. The method of claim 1, wherein the act of routing each of the one or more service components to an appropriate domain manager includes (1) parsing the service order into the one or more service components, and (2) identifying for each service component a corresponding domain manager based on parameters within the service component.

3. The method of claim 1, wherein each service component has a predetermined set of generic parameters, the act of translating the service component includes the acts of (1) mapping the service activation request into specific element transactions, (2) decomposing service component into element activation requests using object networks comprising service activation objects, (3) converting device neutral generic service component into device specific terminology, and (4) composing commands based on a command template stored in the service activation object.

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10. The method of claim 1, wherein the act of activating network elements responsive to the device specific parameters in order to activate the network service includes (1) interpreting the high level commands contained in the received component data, and (2) sending the translated commands to a destination network element in a device specific syntax through corresponding element management system by referencing an appropriate object network.

11. The method of claim 1, further comprising an act of rolling back an implemented service order by combining object networks and developing new object relationships if the change is canceled.

12. The method of claim 1, further comprising an act of rolling back an implemented service order by combining object networks and developing new object relationships if the change is unsuccessfully implemented.

13. The method of claim 1, further comprising an act of recovering by trying another service, after an initial activation attempt fails by combining object networks and developing new object relationships.

14. The method of claim 1, further comprising an act of recovering by trying another combination of services, after an initial activation attempt fails by combining object networks and developing new object relationships.

15. The method of claim 1, further comprising an act of scheduling by defining orders and components with scheduled date parameters.

16. The method of claim 1, further comprising an act of dependency resolution by combining service components in a service order and entering associated dependencies.

17. The method of claim 1, further comprising an act of service activation and service modeling that uses object networks based activation and translation to support generic inputs instead of device specific inputs by employing a set of templates to enable generic description of a service order.

18. The method of claim 1, further comprising the acts of (1) service activation, and (2) service modeling using object networks that provide for service evolution.

19. The method of claim 1, further comprising the acts of (1) building vendor/device specific service activation object networks that can have behavior modified at run time without resetting a service activation system.

20. The method of claim 3, wherein the object network can persist the service translations.

21. The method of claim 3, wherein a plurality of possibilities can exist for modeling detailed decomposition scenarios by applying object networks based service modeling using service activation objects of the type including atomic, multi-step, and logical.

22. The method of claim 10, wherein the act of referencing the appropriate object network for a service and action for a specific network element employs a particular parameter.

23. The method of claim 10, wherein the act of referencing the appropriate object network for a service and action for a specific network element employs a family of devices to which the network element belongs.

24. A service activation system for activating a service on a target network, comprising:

(a) an order processing system for receiving a service order having one or more generic service components;

5 (b) at least one domain manager communicatively connected to the order processing system for receiving the service order, wherein the order processing system is adapted to route the one or more generic service components to an appropriate domain manager of the at least one domain manager and the domain manager translates said generic service component into corresponding device specific parameters; and

(c) at least one element management system communicatively connected to at least one domain manager for receiving the device specific parameters in order to activate the service on the target network.

25. The system of claim 24, further comprising at least one peer manager communicatively connected to the at least one domain manager to route the one or more generic service components to an appropriate domain manager of the at least one domain manager, wherein the one or more generic service components are being received from the at least one order processing system having one or more order processors communicatively connected to said peer manager.

26. The system of claim 24, further comprising at least one gateway as an interface to said service activation system for receiving a service activation request one or more service provisioning systems.

27. The system of claim 24, further comprising at least one order repository for storing network model and service activation related information including service activation objects that are initiated from the derived executing said generic service order components.

28. The system of claim 24, further comprising at least one processing engine in the said gateway for (1) sending and receiving messages, and (2) parsing managed network element responses.

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29. A service activation system for activating a service on a target network management system or other information management system with universal or generic informational changes entered in one or more service provisioning systems, the system comprising:

5 (a) an activation system further comprising:

an order processing system communicatively interconnected between said service provisioning systems and

one or more domain managers communicatively connected to the order processing system for receiving the service order, wherein the domain manager translates said generic service component into corresponding device specific parameters, and the order processing system is adapted to route the one or more generic service components to an appropriate domain manager of the at least one domain manager,

one or more peer managers communicatively connected to the at least one domain manager to route the one or more generic service components to an appropriate domain manager of the at least one domain manager, wherein the one or more generic service components are being received from the at least one order processing system having, wherein each said domain manager having at least one element management system communicatively connected to the at least one domain manager for receiving the device specific parameters in order to activate the service on the target network; and

(b) at least one gateway as an interface to the service provisioning systems, communicatively connected to said service provisioning system for receiving a service activation request, wherein said gateway having a processing engine for

25 (1) sending and receiving messages, and

(2) identifying, parsing service order and component data for population into order database tables.

30. The service activation system of claim 29, wherein the order processing system further comprising:

one or more order processors;

an order repository; and

one or more messaging interfaces,

wherein the order processing system communicatively interconnected between said service provisioning systems and said domain managers via events or said peer managers and the order processing system having a rule engine for performing tasks including advanced processing of service activation objects that are initiated from the derived service order components as determined in the gateway defined by at least one user employing said service provisioning systems.

31. The service activation system of claim 29, wherein the order processing system processes service responsive to the service order parameters;

processes objects to carry out the predefined policies for activating services on the network responsive to the particular incoming generic component activation requests;

manages the element, network, service, and business layers; and

determines using an aggregate of element and network service request messages, how to activate the requested service on the physical managed network element;

employs at least one of said peer manager to communicate with said domain managers and said element management systems;

uses generic rule sets to submit component activation request, request closure, request the component activation to be rolled back or reversed, and request component activation status; and

performs the service management functions, inventory management, and distribution of service orders to domain managers managing their respective destination network elements via element management systems.

32. The service activation system of claim 29, wherein the order processing system further comprising:

a plurality of graphical user interfaces facilitating access to said order processing system, wherein user interface may be any suitable device such as a display terminal for providing users with interactive access to the order processing system.

33. The service activation system of claim 29, wherein the domain manager receives generic component activation requests from order processing system and map the activation request into specific element transactions through the use of service activation objects stored in a database;

translates vendor neutral generic service components into vendor specific terminology by interpreting the high level commands contained in the received component data and sends the translated commands to a destination network element in a device specific syntax through corresponding element management systems;

decomposes generic service component into element activation requests using object networks and routes vendor specific parameters to the appropriate element management system by referencing object network for a service and action for a specific network element using a particular parameter;

provides a means to rollback an implemented change if the change is canceled or unsuccessfully implemented by combining object networks and developing new object relationships;

provides a means to perform scheduling and dependency resolution by population of date and predecessors parameters; and

provides a means for recovery or try another service or combination of services, after an initial activation attempt has failed by combining object networks and developing new object relationships.

34. The system of claim 29, further comprising an user interface operably connected to the gateway and the activation system for displaying to a user status and alert information.

35. The system of claim 29, wherein the gateway comprises a plurality of distributed gateways.

36. A memory device having instructions that when loaded into and executed by at least one computer implements the service activation system of claim 29.

37. The system of claim 29, further comprising a service builder editor operably connected to the order repository of the order processing system.

38. The system of claim 29, wherein the service activation system comprises means for tracking of the use and availability of managed network elements.

39. The system of claim 29, wherein the service activation system comprises means for provisioning service orders for network resources.

40. The system of claim 29, wherein the service activation system comprises means for scheduling activities related to completion of service orders.

41. The system of claim 29, wherein the service activation system comprises means for creating a network design.

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C1 42. The system of claim 29, wherein the service activation system comprises means for automatically performing service and actions on network element inventory to satisfy a service order request.

43. The system of claim 29, wherein the service activation system is a component of an operations support system.

44. A service activation system for activating a service on a target network management system or other information management system with universal informational changes entered in one or more service provisioning systems, the system comprising:

means for describing a service by one or more universal service components using universal service component relationships stored in a database;

means for translating a service by employing universal service translation including parameter mapping, service decomposition, and command composition; and

means for activating a service by applying service modeling using object networks including atomic, multi-step, and logical objects.

45. The system of claim 44, wherein the means for describing a service comprises:

means for populating a service into said one or more service provisioning systems using said one or more universal service components;

means for grouping said one or more universal service component instances together to compose a service order; and

means for spawning of the desired service order design to an activation system through a messaging interface.

46. The system of claim 44, wherein the means for translating a service comprises:

means for processing of a service order by the activation system;

means for routing said one or more universal service components to an appropriate domain managers;

means for translating vendor neutral said one or more universal service components into vendor specific form;

means for translating device neutral said one or more universal service components into device specific form;

means for decomposing said one or more universal service components into element activation requests using object networks;

means for routing vendor specific parameters to the appropriate element management systems; and

5 means for routing location specific parameters to the appropriate element management systems.

47. The system of claim 44, wherein the means for activating a service comprises:

means for initiating vendor specific events, delivering activation commands or data to network elements through an appropriate element management system to enable the desired service;

5 means for initiating device specific events, delivering activation commands or data to network elements through an appropriate element management system to enable the desired service; and

means for sending status responses through the activation system and said messaging interface to the appropriate service provisioning system.

48. A universal service activation system comprising:

means for populating into a service provisioning system one or more universal service components;

5 means for grouping said universal service component instances together to compose a service order;

means for spawning of the desired service order design to an activation system through at least one messaging interface;

means for processing of a service order by the activation system;

means for routing said universal service components to an appropriate domain manager;

means for translating vendor neutral said universal service components into vendor specific format;

means for translating device neutral said universal service components into device specific format;

means for decomposing said universal service components into element activation requests using object networks;

means for routing vendor specific parameters to an appropriate element management system;

20 means for routing location specific parameters to an appropriate element management system;

means for initiating vendor specific events, delivering activation commands or data to network elements through an appropriate element management system to enable the desired service;

25 means for initiating device specific events, delivering activation commands or data to network elements through an appropriate element management system to enable the desired service; and

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Sub A 14 means for sending status responses through the activation system and an appropriate messaging interface to the appropriate one or more service provisioning systems.

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49. A computer-implemented method for universal service activation comprising:

describing a service;
translating a service; and
activating a service.

50. A computer-implemented method for service description process of claim 49 further comprising the steps of:

populating a service into a service provisioning system using one or more universal service components;

grouping said universal service component instances together to compose a service order; and

spawning of the desired service order design to an activation system through a messaging interface.

51. A computer-implemented method for service translation process of claim 49 further comprising the steps of:

processing of a service order by the activation system;

routing said universal service components to an appropriate domain manager;

translating vendor neutral universal service components into vendor specific form;

translating device neutral universal service components into device specific form;

decomposing said universal service component into element activation requests using object networks;

routing vendor specific parameters to the appropriate element management system;

and

routing location specific parameters to the appropriate element management system.

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52. A computer-implemented method for service activation process of claim 49

further comprising the steps of:

7 initiating vendor specific events, delivering activation commands or data to network
elements through an element management system to enable the desired service;

initiating device specific events, delivering activation commands or data to network elements through an element management system to enable the desired service; and

sending status responses through the activation system and the appropriate messaging interface to the appropriate service provisioning system.

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| Year | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 | 2097 | 2098 | 2099 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 | 2097 | 2098 | 2099 | |

53. A computer-implemented method for universal service activation comprising the steps of:

populating into one or more service provisioning system one or more generic service components;

5 grouping said generic service component instances together to compose a service order;

Sub A16 spawning of the desired service order design to an activation system through a messaging interface;

processing of a service order by the activation system;

routing said generic service components to an appropriate domain manager;

translating vendor neutral generic service components into vendor specific terminology;

translating device neutral generic service components into device specific terminology;

decomposing said generic service components into element activation requests using object networks;

routing vendor specific parameters to the appropriate element management system;

routing location specific parameters to the appropriate element management system;

initiating vendor specific events, delivering activation commands or data to network elements through an element management system to enable the desired service;

20 initiating device specific events, delivering activation commands or data to network elements through an element management system to enable the desired service; and

sending status responses through the activation system and the appropriate messaging interface to the appropriate service provisioning system.

54. A service activation system for activating a service on a target network, comprising:

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- (a) an order processing system for receiving a service order having one or more generic service components;
- (b) at least one domain manager communicatively connected to the order processing system for receiving the service order, wherein the order processing system is adapted to route the one or more generic service components to an appropriate domain manager of the at least one domain manager and the domain manager translates said generic service component into corresponding device specific parameters;
- (c) at least one element management system communicatively connected to at least one domain manager for receiving the device specific parameters in order to activate the service on the target network; and
- (d) at least one connection into an order database for receiving a service activation request one or more service provisioning systems.

55. A service activation system for activating a service on a target network, comprising:

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- (a) an order processing system for receiving a service order having one or more generic service components;
- (b) at least one domain manager communicatively connected to the order processing system for receiving the service order, wherein the order processing system is adapted to route the one or more generic service components to an appropriate domain manager of the at least one domain manager and the domain manager translates said generic service component into corresponding device specific parameters; and
- (c) at least one network management system communicatively connected to at least one domain manager for receiving the device specific parameters in order to activate the service on the target network.

56. The system of claim 55, further comprising at least one peer manager communicatively connected to the at least one domain manager to route the one or more generic service components to an appropriate domain manager of the at least one domain manager, wherein the one or more generic service components are being received from the at least one order processing system having one or more order processors communicatively connected to said peer manager.

57. The system of claim 55, further comprising at least one gateway as an interface to said service activation system for receiving a service activation request one or more service provisioning systems.

58. The system of claim 55, further comprising at least one order repository for storing network model and service activation related information including service activation objects that are initiated from the derived executing said generic service order components.

59. The system of claim 55, further comprising at least one processing engine in the said gateway for (1) sending and receiving messages, and (2) parsing managed network element responses.

60. The system of claim 55, further comprising at least one connection into an order database for receiving a service activation request one or more service provisioning systems.

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61. A service activation system for activating a service on a target network management system or other information management system with universal or generic informational changes entered in one or more service provisioning systems, the system comprising:

5 (a) an activation system further comprising:

an order processing system communicatively interconnected between said service provisioning systems and

one or more domain managers communicatively connected to the order processing system for receiving the service order, wherein the domain manager translates said generic service component into corresponding device specific parameters, and the order processing system is adapted to route the one or more generic service components to an appropriate domain manager of the at least one domain manager,

one or more peer managers communicatively connected to the at least one domain manager to route the one or more generic service components to an appropriate domain manager of the at least one domain manager, wherein the one or more generic service components are being received from the at least one order processing system having, wherein each said domain manager having at least one network management system communicatively connected to the at least one domain manager for receiving the device specific parameters in order to activate the service on the target network; and

(b) at least one gateway as an interface to the service provisioning systems, communicatively connected to said service provisioning system for receiving a service activation request, wherein said gateway having a processing engine for

25 (1) sending and receiving messages, and

(2) identifying, parsing service order and component data for population into order database tables.

62. The service activation system of claim 61, wherein the order processing system further comprising:

one or more order processors;

an order repository; and

one or more messaging interfaces,

wherein the order processing system communicatively interconnected between said service provisioning systems and said domain managers via events or said peer managers and the order processing system having a rule engine for performing tasks including advanced processing of service activation objects that are initiated from the derived service order components as determined in the gateway defined by at least one user employing said service provisioning systems.

63. The service activation system of claim 61, wherein the order processing system processes service responsive to the service order parameters;

processes objects to carry out the predefined policies for activating services on the network responsive to the particular incoming generic component activation requests;

manages the element, network, service, and business layers; and

determines using an aggregate of element and network service request messages, how to activate the requested service on the physical managed network element;

employs at least one of said peer manager to communicate with said domain managers and said element management systems;

uses generic rule sets to submit component activation request, request closure, request the component activation to be rolled back or reversed, and request component activation status; and

performs the service management functions, inventory management, and distribution of service orders to domain managers managing their respective destination network elements via element management systems.

64. The service activation system of claim 61, wherein the order processing system further comprising:

a plurality of graphical user interfaces facilitating access to said order processing system, wherein user interface may be any suitable device such as a display terminal for providing users with interactive access to the order processing system.

65. The service activation system of claim 61, wherein the domain manager receives generic component activation requests from order processing system and map the activation request into specific element transactions through the use of service activation objects stored in a database;

translates vendor neutral generic service components into vendor specific terminology by interpreting the high level commands contained in the received component data and sends the translated commands to a destination network element in a device specific syntax through corresponding element management systems;

decomposes generic service component into element activation requests using object networks and routes vendor specific parameters to the appropriate element management system by referencing object network for a service and action for a specific network element using a particular parameter;

provides a means to rollback an implemented change if the change is canceled or unsuccessfully implemented by combining object networks and developing new object relationships;

provides a means to perform scheduling and dependency resolution by population of date and predecessors parameters; and

provides a means for recovery or try another service or combination of services, after an initial activation attempt has failed by combining object networks and developing new object relationships.

66. The system of claim 61, further comprising an user interface operably connected to the gateway and the activation system for displaying to a user status and alert information.

67. The system of claim 61, wherein the gateway comprises a plurality of distributed gateways.

68. A memory device having instructions that when loaded into and executed by at least one computer implements the service activation system of claim 61.

69. The system of claim 61, further comprising a service builder editor operably connected to the order repository of the order processing system.

70. The system of claim 61, wherein the service activation system comprises means for tracking of the use and availability of managed network elements.

71. The system of claim 61, wherein the service activation system comprises means for provisioning service orders for network resources.

72. The system of claim 61, wherein the service activation system comprises means for scheduling activities related to completion of service orders.

73. The system of claim 61, wherein the service activation system comprises means for creating a network design.

74. The system of claim 61, wherein the service activation system comprises means for automatically performing service and actions on network element inventory to satisfy a service order request.

75. The system of claim 61, wherein the service activation system is a component of an operations support system.

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